

What is claimed is:

1. A refillable ink cartridge for removable connection to a print head, the ink cartridge comprising:
 - 5 (a) at least one ink chamber comprising side walls and a bottom wall;
 - (b) a cover hermetically sealing the ink chamber or chambers by forming a top wall therefor;
 - (c) a tube associated with each ink chamber, the tube extending from the cover into the ink chamber and comprising a continuous opening extending
10 from an upper to a lower end of the tube;
 - (d) a valve associated with the opening at the lower end of the tube to enable the opening to be opened and closed to controllably admit air into the ink chamber; and
 - (e) an ink supply port through which ink is supplied to the print head
15 via an ink supply needle.
2. A refillable ink cartridge according to claim 1, wherein an operational negative pressure within the ink chamber is regulated by the valve so that the operational negative pressure is sufficiently low to maintain a flow of ink from to
20 the ink supply needle as required whilst being sufficiently high to prevent seepage of ink therefrom.
3. A refillable ink cartridge according to claim 1, wherein the tube associated with each ink chamber is an elongate tube.
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4. A refillable ink cartridge according to claim 3, wherein the elongate tube further comprises more than one reinforcing rib running along its length.
5. A refillable ink cartridge according to claim 1, wherein the lower end of
30 the tube extends into a well positioned in the bottom wall of the ink chamber.
6. A refillable ink cartridge according to claim 1, wherein the valve comprises a movable portion and a fixed portion.

7. A refillable ink cartridge according to claim 1, wherein the valve comprises a resiliently deformable material which deforms to admit air from the tube into the ink chamber when the pressure in the tube sufficiently exceeds the pressure in the ink chamber.

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8. A refillable ink cartridge for removable connection to a print head via an ink supply needle, the ink cartridge comprising:

- (a) at least one ink chamber;
- (b) a cover hermetically sealing the ink chamber or chambers;
- 10 (c) an ink supply port having an aperture for receiving the ink supply needle; and
- (d) a stopper for the ink supply port;

wherein when the ink supply needle is inserted through the aperture in the ink supply port, the stopper is moved away from the aperture, thereby
15 opening the ink supply port and when the ink supply needle is withdrawn from the aperture the stopper covers the aperture, thereby closing the ink supply port.

9. A refillable ink cartridge according to claim 8, wherein the stopper is
20 resiliently biased towards opening the aperture.

10. A refillable ink cartridge according to claim 9, wherein the resilient biasing occurs by means of a compression spring.

25 11. A refillable ink cartridge according to claim 10, wherein the compression spring is formed from polyoxymethylene.

12. A method of assembling a refillable ink cartridge, the ink cartridge including an ink chamber having side walls and a bottom wall which includes an
30 ink supply port, the method comprising:

- (a) welding a filter to an upper portion of the ink supply port;
- (b) installing a stopper in the ink supply port;
- (c) sealing the ink supply port with a deformable film;

(d) attaching a flexible film to a portion of the lower opening of a tube, the tube extending into the ink chamber from a cover forming a top wall of the ink chamber;

5 (e) sealing an ink injection port positioned within the cover with a resilient plug;

(f) welding of the cover to the ink chamber to form the top wall;

(g) adhering a tape to an external surface of the cover to seal apertures therein;

10 (g) evacuation of the ink chamber via a needle inserted through the plug sealing the ink injection port; and

(h) supply of ink to the ink chamber via a needle inserted through plug in the ink injection port.